Summary of last lecture

- Entity Relationship model
- Entity set, relationship set
- Attributes – simple, composite, derived, single-valued, multi-valued
- Cardinality
- E-R diagram

Keys

- Key – A key for an entity is a set of attributes that suffice to distinguish entities from each other or uniquely define that entity.

- Types -
- Superkey
- Candidate Key
- Primary Key
- Foreign Key

Superkey

● A superkey is a set of one or more attributes that, taken collectively, allow us to uniquely identify a tuple in the relation.

Emp_ID	Emp_Name	DOB	Gender	Dept_No
E101	Ramkumar	15-JUL-1986	M	2
E103	Ramesh	04-MAY-1989	M	1
E104	Stephen	29-OCT-1987	M	1
E102	Nirmal	23-JAN-1980	M	3
E105	Laxmi	20-MAY-1988	F	4
E107	Rani	23-JAN-1980	F	4
E106	Ramesh	12-MAR-1979	M	2

Superkey Example

Emp_ID	Emp_Name	DOB	Gender	Dept_No
E101	Ramkumar	15-JUL-1986	M	2
E103	Ramesh	04-MAY-1989	M	1
E104	Stephen	29-OCT-1987	M	1
E102	Nirmal	23-JAN-1980	M	3
E105	Laxmi	20-MAY-1988	F	4
E107	Rani	23-JAN-1980	F	4
E106	Ramesh	12-MAR-1979	M	2

SuperKey- {Emp_ID}

{Emp_ID,Emp_Name},{Emp_ID,DOB},

{Emp_Name,DOB},

{Emp_Name, DOB, Gender},...

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Candidate Key

Candidate key is nothing but minimal super keys for which no proper subset is a super key.

SuperKey- {Emp_ID}

  {Emp_ID,Emp_Name},{Emp_ID,DOB},

  {Emp_Name,DOB},

  {Emp_Name, DOB, Gender},...

Candidate Key – {Emp_ID}

  {Emp_Name, DOB}

Primary Key

- The term primary key is used to denote a candidate key that is chosen by database designer as principal means of identifying entities within an entity set.

- Primary key entity in the set cannot have the same value for two or more tuples i.e. unique and it cannot be null.

- Primary Key - {Emp_ID}

Foreign Key

- A relation, say r1, may include among its attributes the primary key of another relation, say r2. This attribute is called a foreign key from r1, referencing r2.

- ➢ r1 - referencing relation
- ➢ r2- referenced relation

Foreign Key Example

ID	name	dept_name	salary
10101	Srinivasan	Comp. Sci.	65000
12121	Wu	Finance	90000
15151	Mozart	Music	40000
22222	Einstein	Physics	95000
32343	El Said	History	60000
33456	Gold	Physics	87000
45565	Katz	Comp. Sci.	75000
58583	Califieri	History	62000
76543	Singh	Finance	80000
76766	Crick	Biology	72000
83821	Brandt	Comp. Sci.	92000
98345	Kim	Elec. Eng.	80000

dept_name	building	budget
Biology	Watson	90000
Comp. Sci.	Taylor	100000
Elec. Eng.	Taylor	85000
Finance	Painter	120000
History	Painter	50000
Music	Packard	80000
Physics	Watson	70000

Referencing relation –Instructor

Referenced relation –Department

Foreign Key - dept_name

E-R Model   Contd…

- **Weak Entity Sets**

➢ An entity set that does not have a primary key is referred to as a *weak entity set.*

➢ The existence of a weak entity set depends on the existence of a *identifying entity set*

➢ The *discriminator (or partial key)* of a weak entity set is the set of attributes that distinguishes among all the entities of a weak entity set.

➢ The primary key of a weak entity set is formed by the primary key of the strong entity set on which the weak entity set is existence dependent, plus the weak entity set's discriminator.
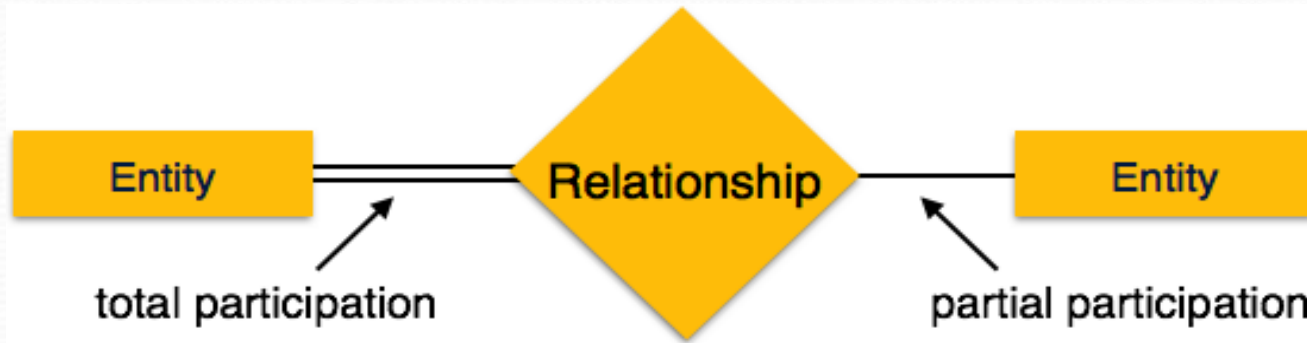
E-R Model   Contd…

- ## **Weak Entity Sets**

➢ We depict a weak entity set by double rectangles.

➢ We underline the discriminator of a weak entity set with a dashed line.

➢ *payment-number* – discriminator of the payment entity set

➢ Primary key for *payment* – (*loan-number, payment-number*)
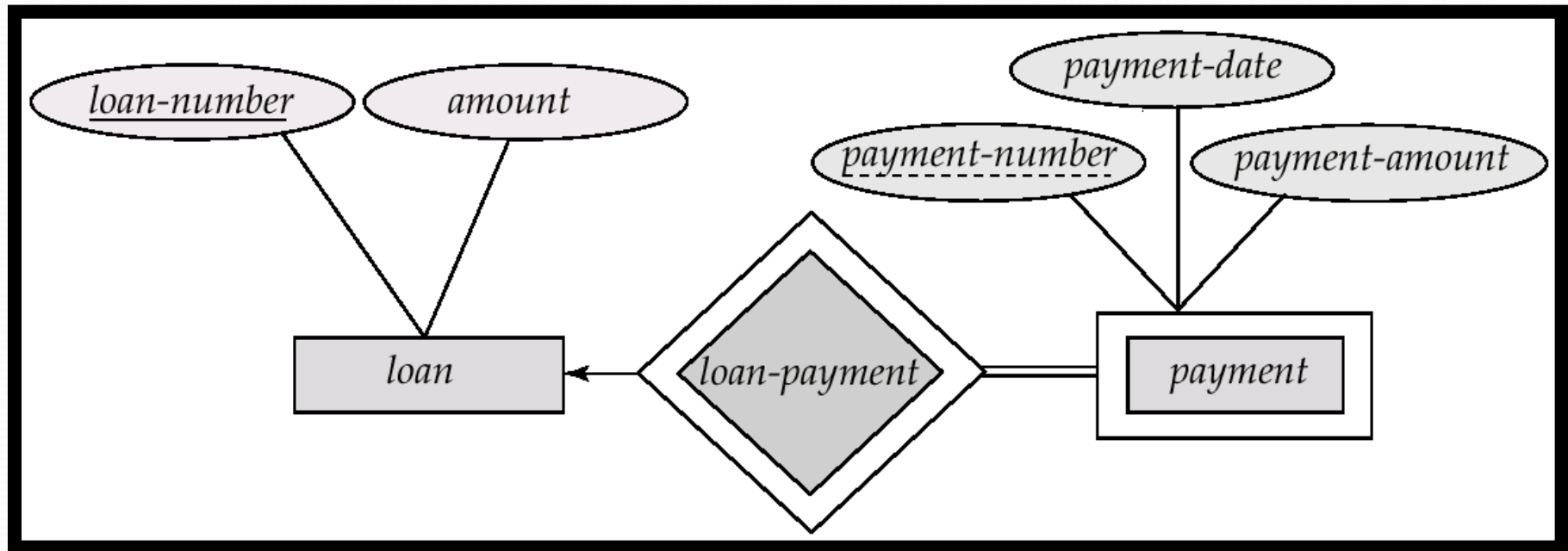
E-R Model   Contd…

Total Participation − Each entity is involved in the relationship. Total participation is represented by double lines.

Partial participation − Not all entities are involved in the relationship. Partial participation is represented by single lines.